Technical Preview of the United States Demonstration of an Attribute Measurement System with Information Barrier

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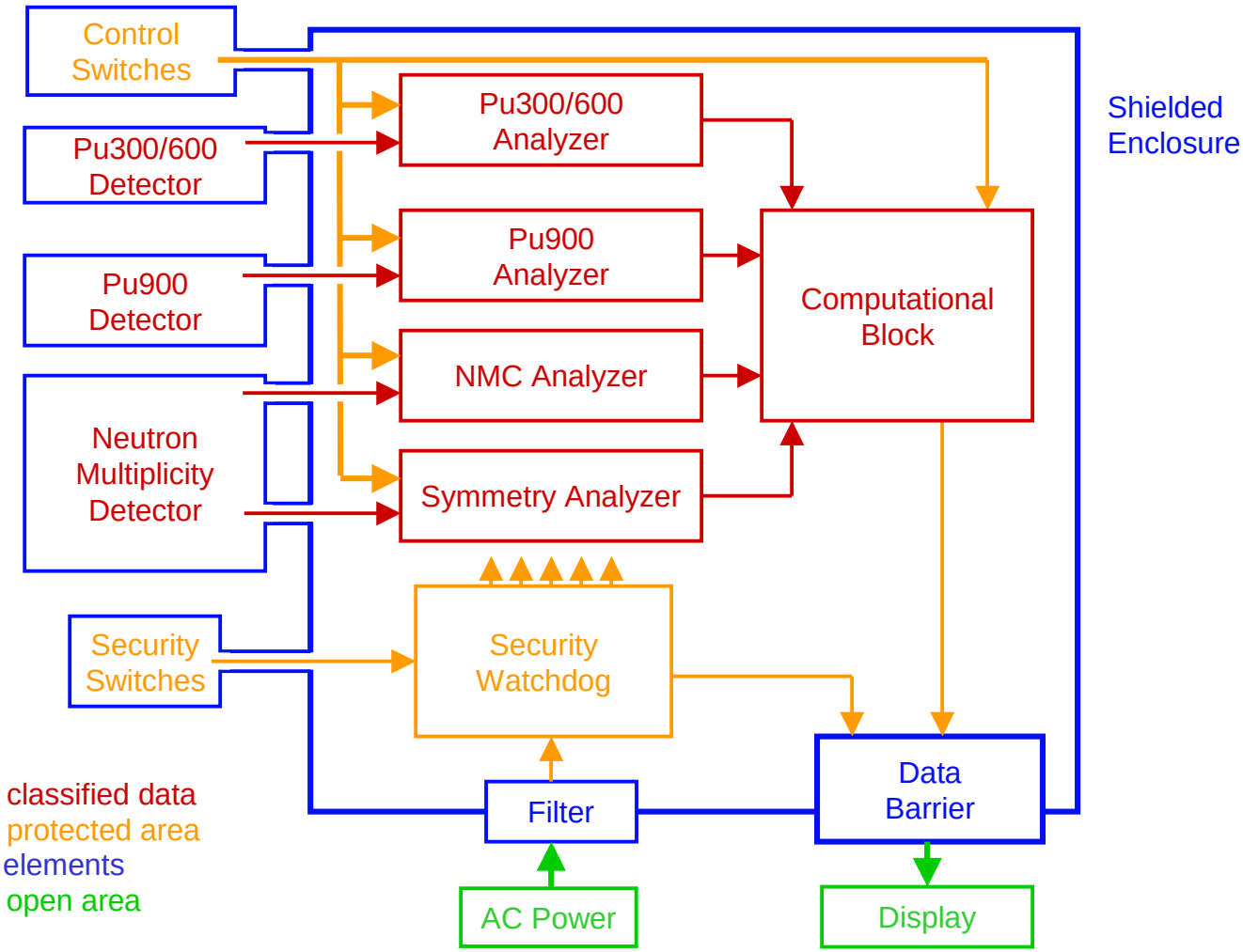
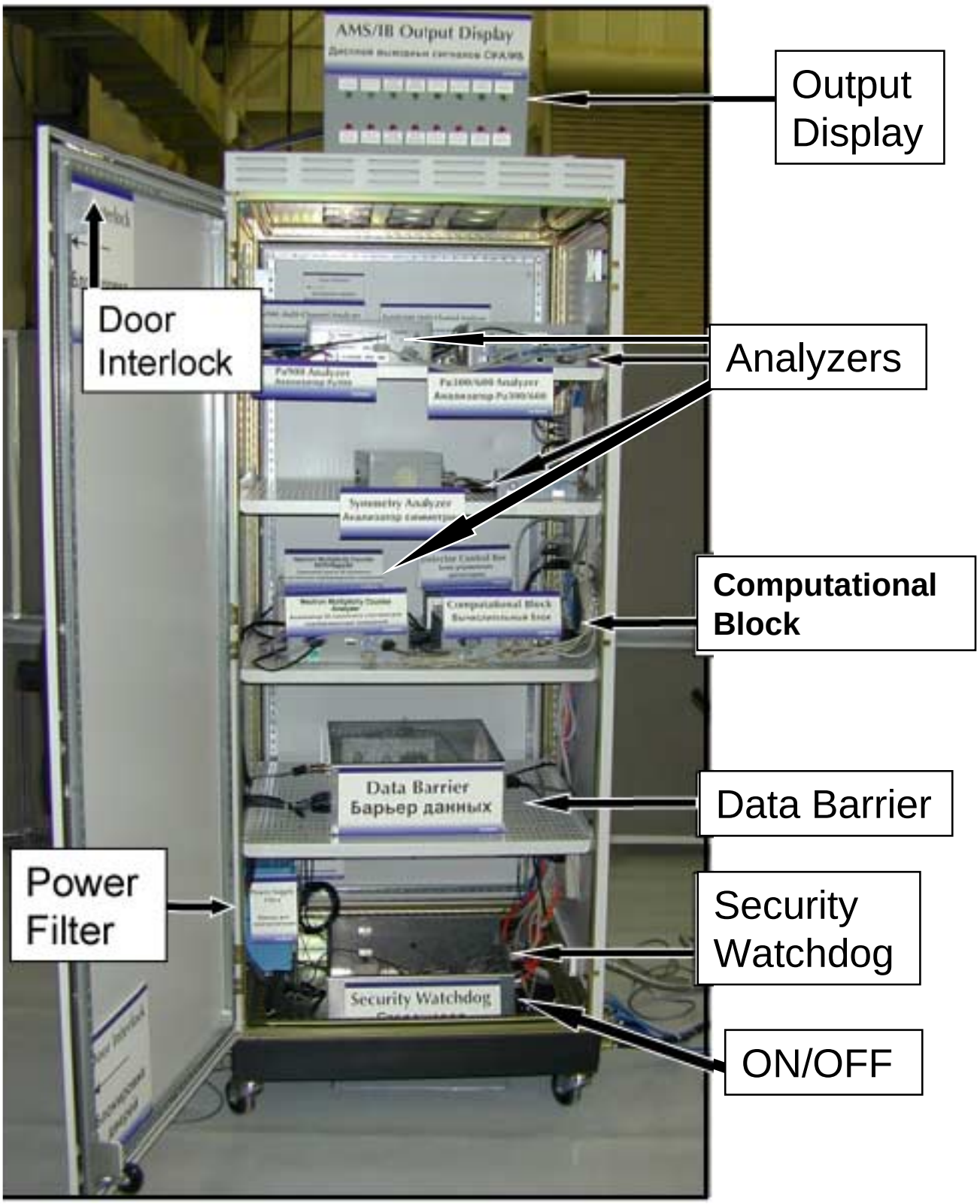
The AMS/IB



- potentially contains classified data
- unclassified data in protected area
- unclassified barrier elements
- unclassified data in open area

The Shielded AMS/IB

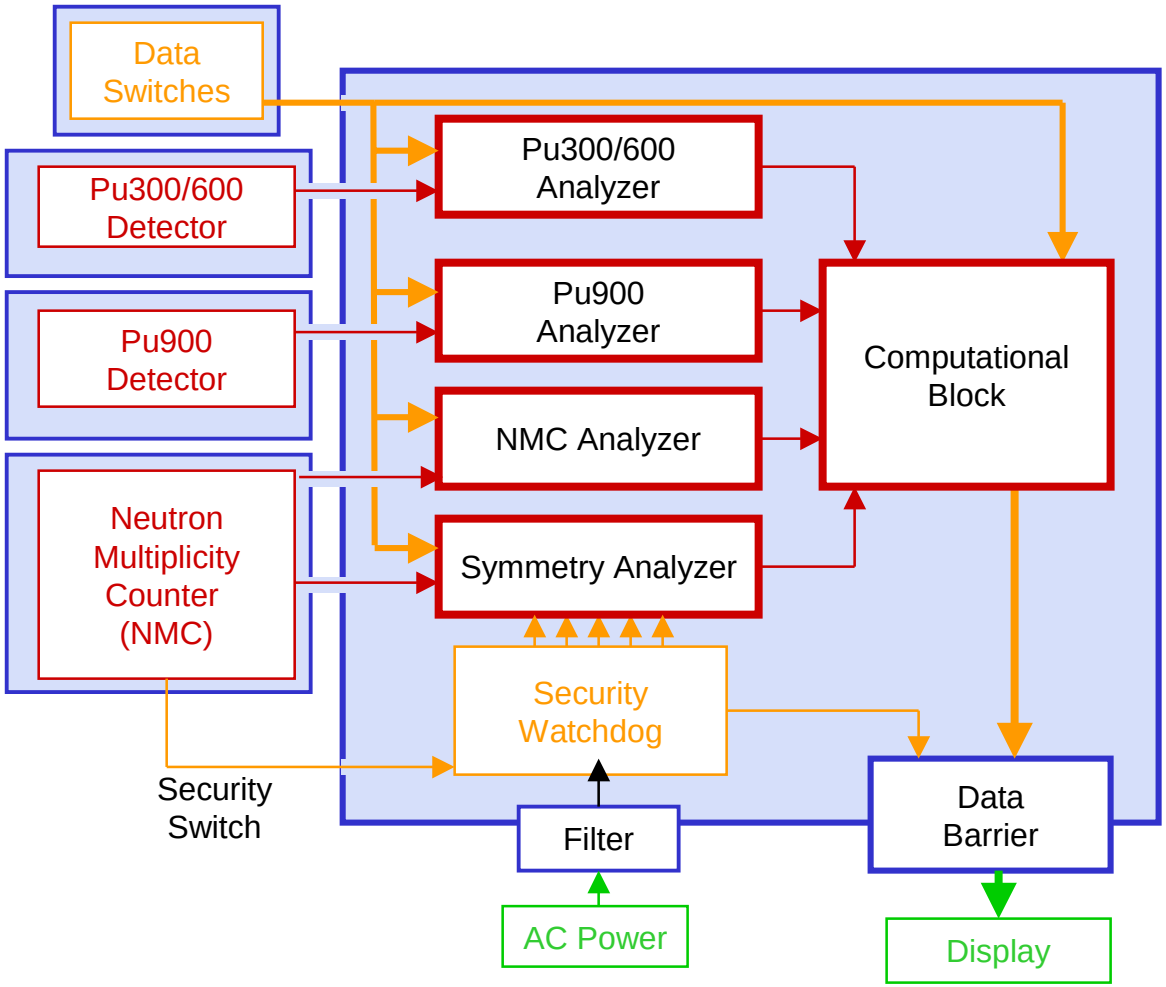
Shielded Electronics Rack



Detector Control Box Controlled by Operator

- Background
- Measurement Control
- Gamma Calibration
- Assay

Computers



- Boot off PROMS
- For assay:
  - No monitors
  - No keyboards

- potentially contains classified data
- unclassified data in protected area
- barrier elements
- unclassified data in open area

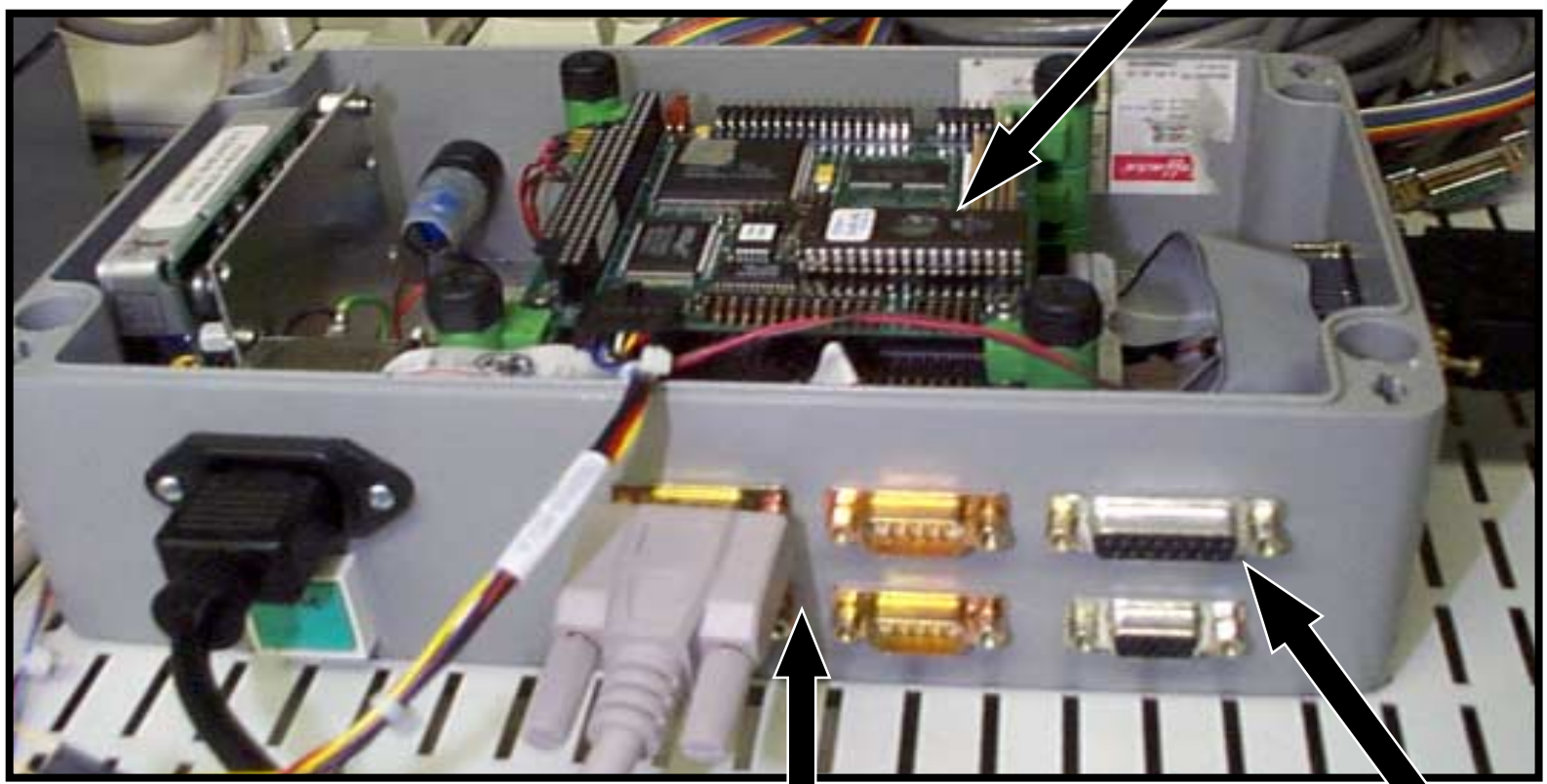
Computers

	PC104 CPU	DOS Version	Application Language
Pu300/600 Analyzer	EMAC SBC-4335	MS-DOS 6.22	MS Visual C 1.52 MS FORTRAN 90
Pu900 Analyzer	EMAC SBC-4335	MS-DOS 6.22	MS Visual C 1.52 MS FORTRAN 90
Symmetry Analyzer	EMAC SBC-4335	MS-DOS 6.22	MS Visual C 1.52 MS FORTRAN 90
NMC Analyzer	Ampro CoreModule 3SXi	ROM DOS 6.22	MS Visual C 1.52
Computational Block	Ampro CoreModule 3SXi	ROM DOS 6.22	MS Visual C 1.52

Computational Block

- Holds threshold values
- Performs comparisons, determines pass/fail for each attribute
- Memory is volatile or read only
- Test-complete signal
- Error signal

Computational Block



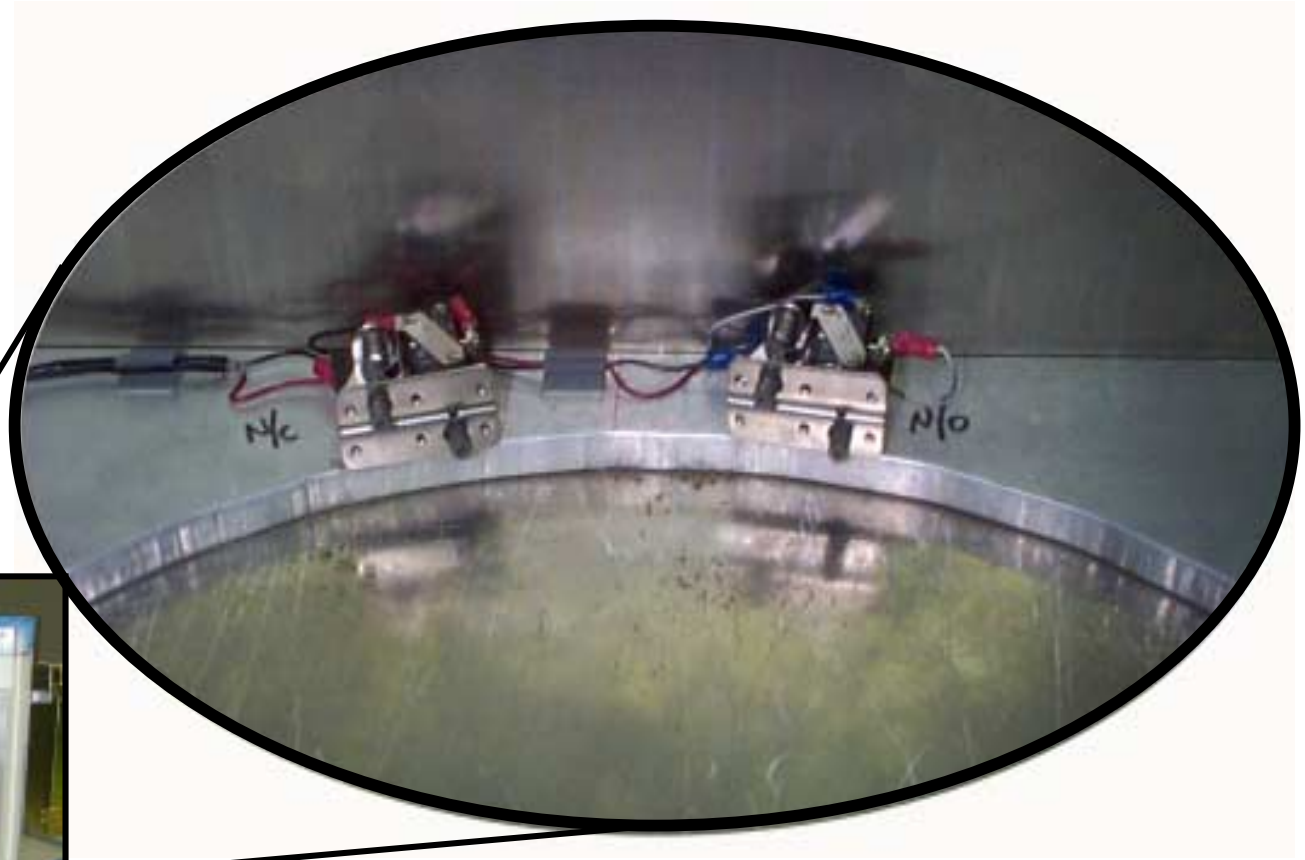
Computational Block Memory

- PROM – nonvolatile memory (Atmel 27C080)
  - contains executable program
  - read-only memory, cannot be written to
- CMOS – disabled, no battery
- RAM – 4 MB of volatile memory
- Flash ROM – nonvolatile system BIOS memory
  - write-disabled with pin 11 lifted or Jumper W2 missing
- EEPROM – nonvolatile memory, can be written to
  - necessary for system configuration information
  - minimum data storage (256 bytes)

Measurement Type: Classified or Unclassified

- Measurement type is determined by the container
- No input from operator
- Detector empty — Classified measurement
- Unmodified ALR-8 in detector — Classified measurement
- Modified ALR-8 in detector — Unclassified measurement

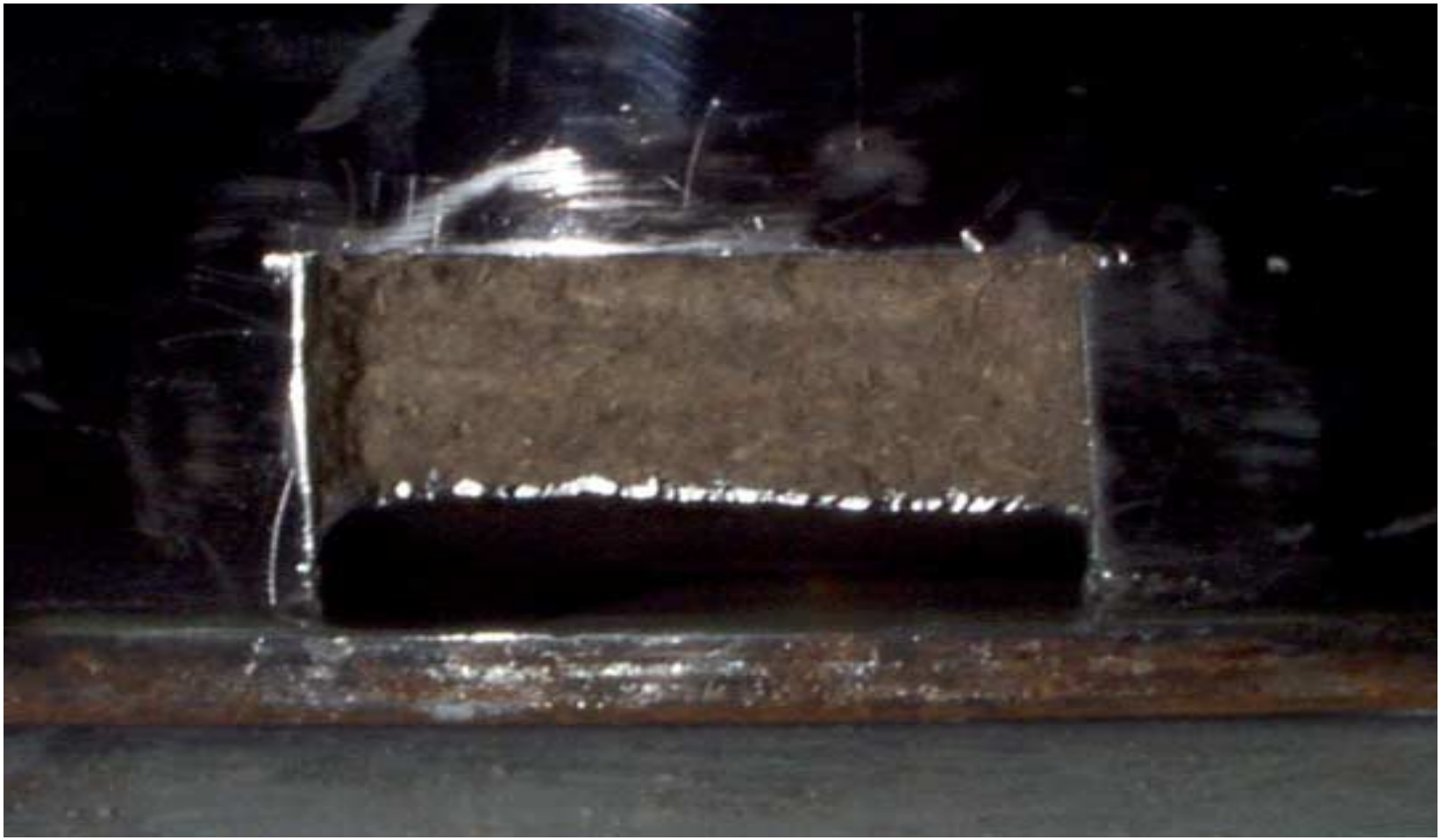
Security Switches



Container for Classified Component: ALR-8

Authentication Container: Modified ALR-8

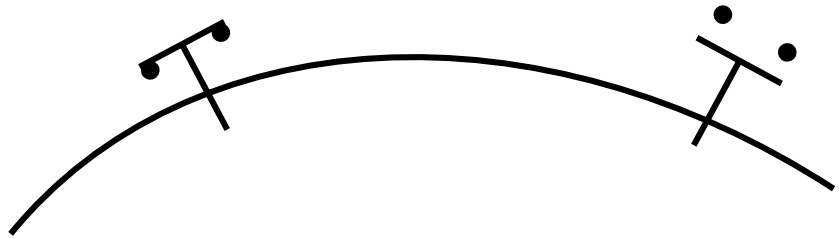
Authentication Container



Security Switches

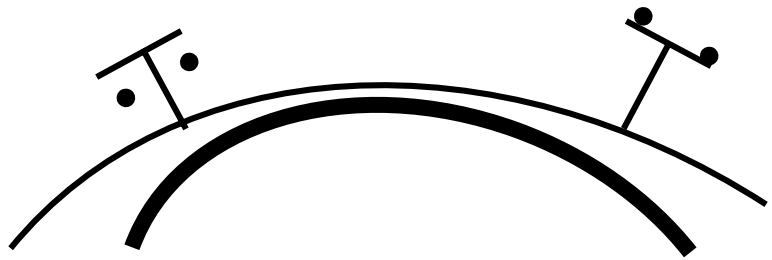
System Secure—No Container

Closed/Open



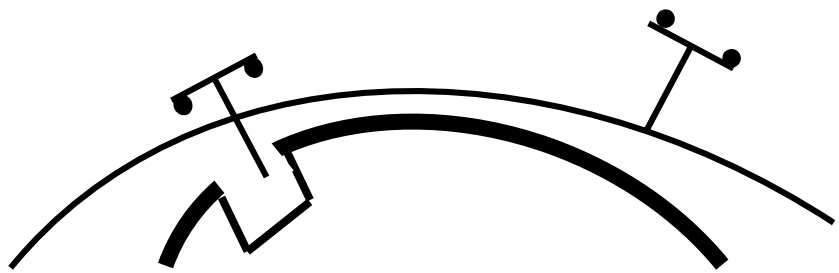
System Secure—Unmodified Container

Open/Closed



System Open—Modified Container

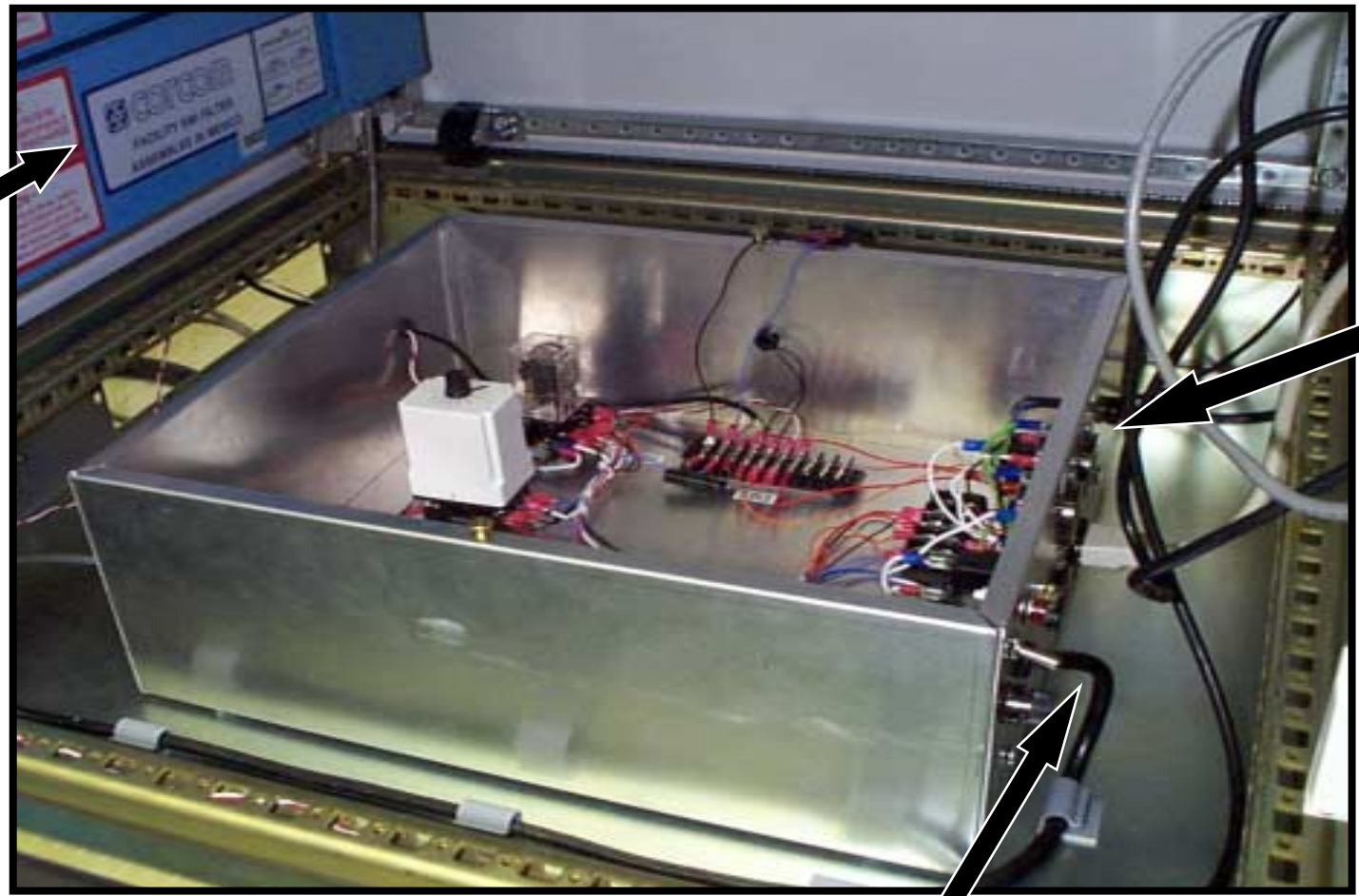
Closed/Closed



Security Watchdog

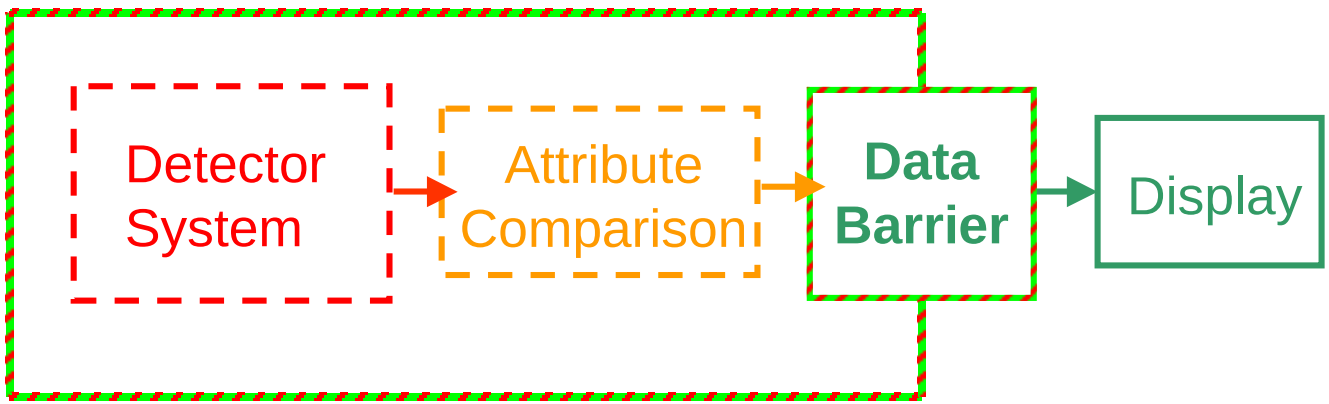
- Security Watchdog controls power to all other elements of AMS/IB.
- If any shielded enclosure is opened, power is immediately removed from the rest of the AMS/IB and all data are purged.
- In open mode, power is restored after a delay.
- Authentication occurs in open/unclassified mode.
- SCRAM switch will remove all power and purge all data from the system at any time the operator demands it.

Security Watchdog

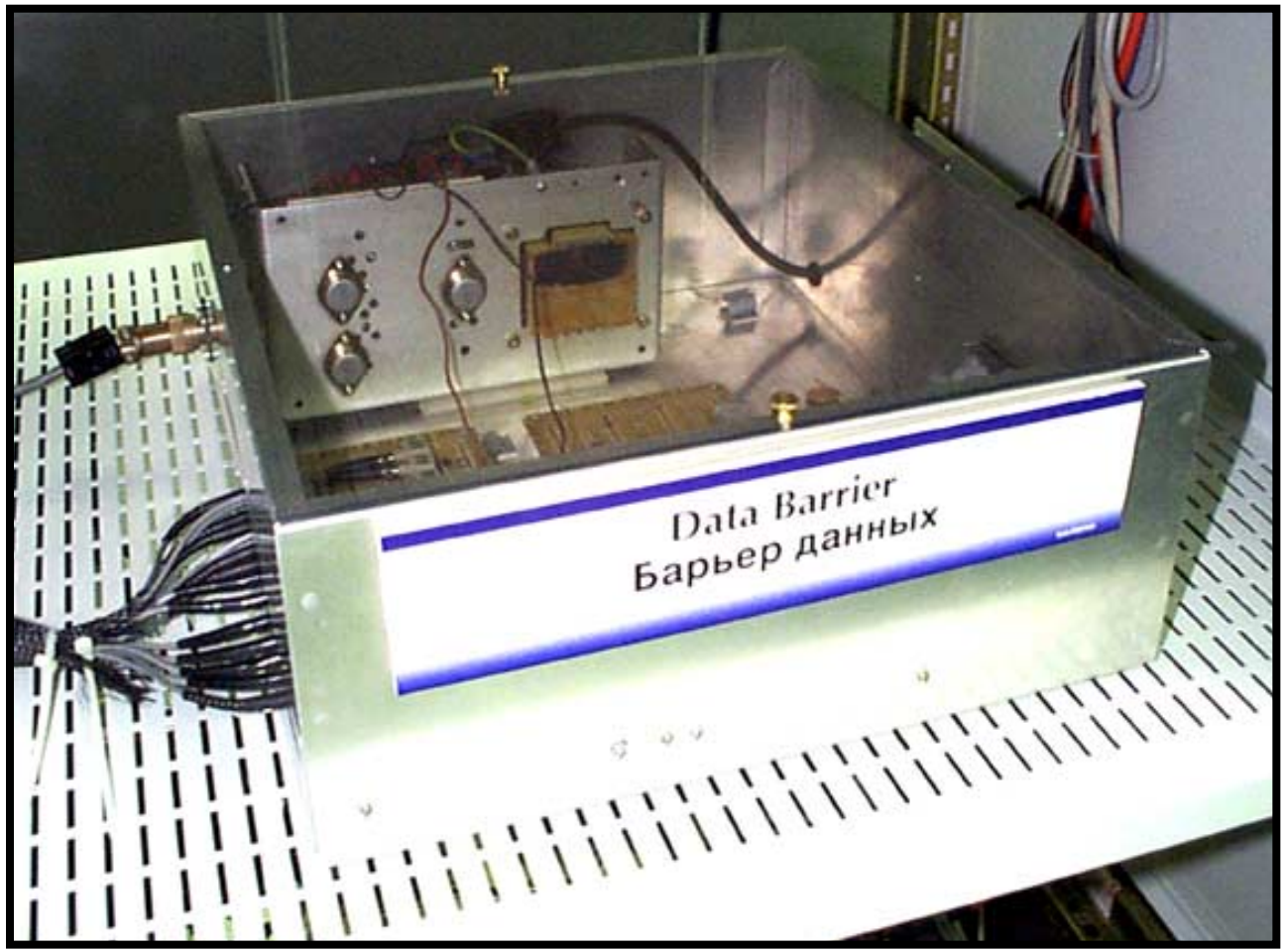


Data Barrier

- Controls flow of data across the IB.
- Outputs 1 bit of data per input line.
- Extra layer of defense between red and green.



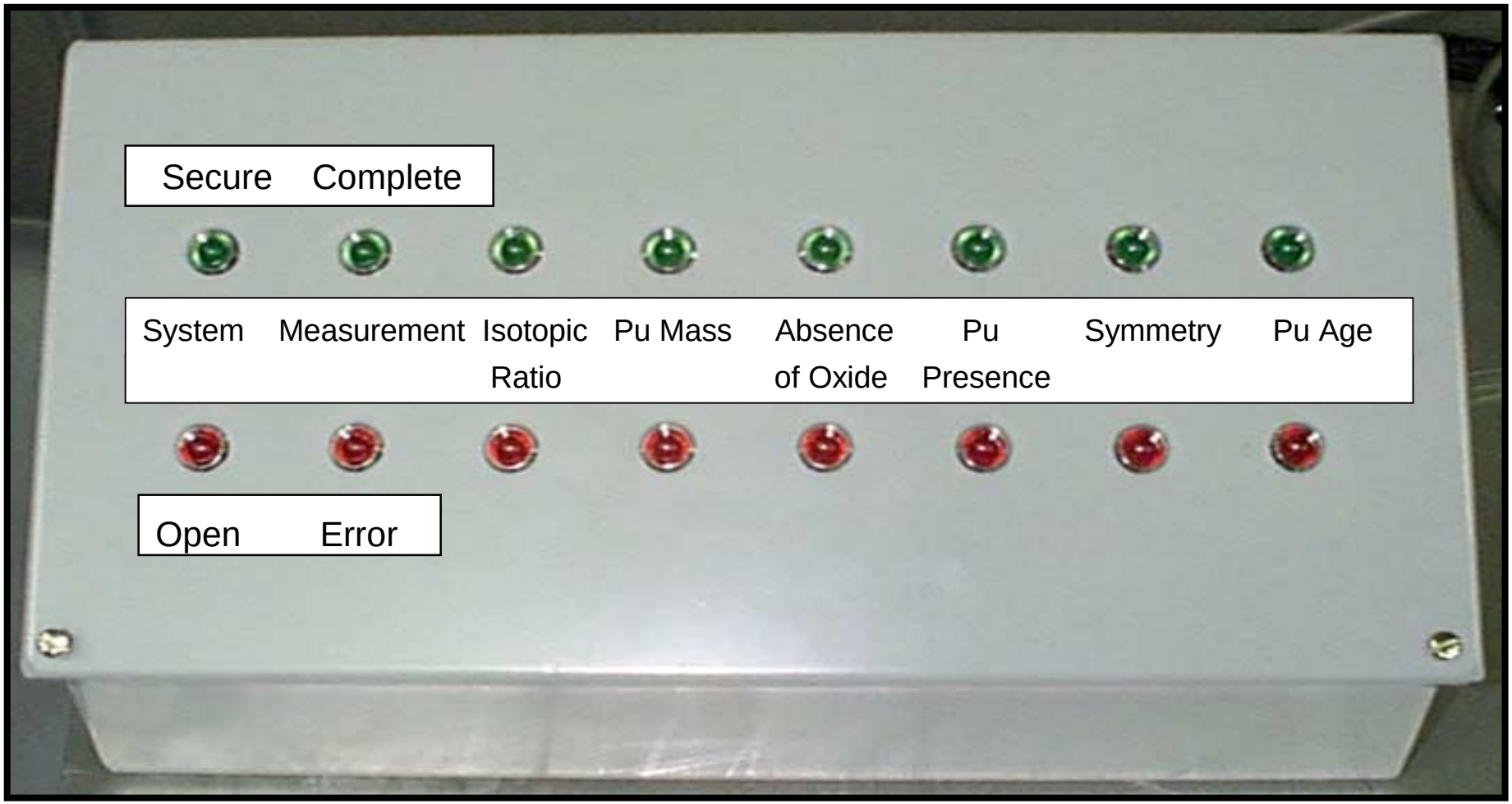
Data Barrier



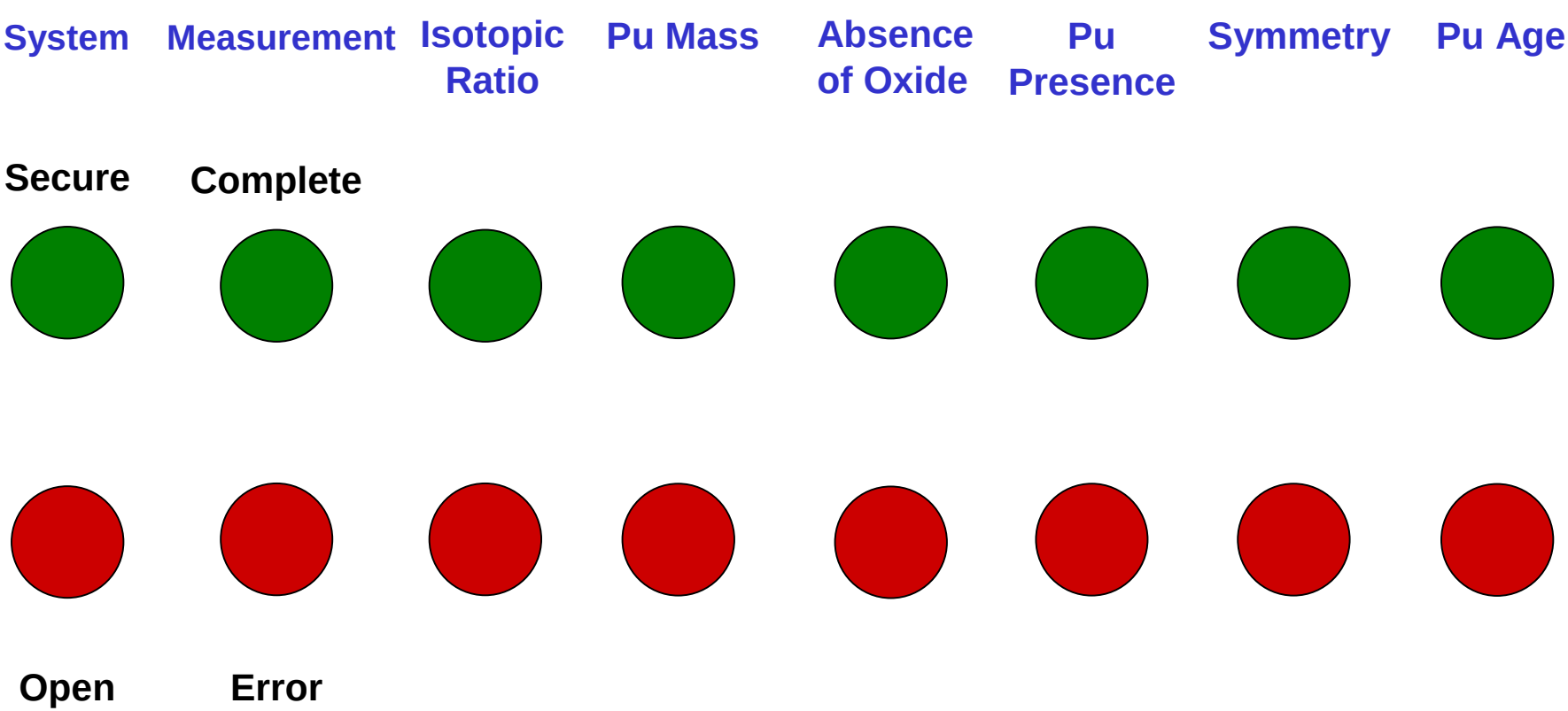
Display

- Receives unclassified data from the data barrier, via fiber optic coupling
- Eight paired red-light/green-light outputs
- Controlled by computational block
  - Six attributes (12 possible results)
  - Measurement Complete/Failure (2 possibilities)
- Controlled by Security Watchdog
  - Security Mode (2 possible modes)
- No data logging

Display


Secure
Complete
System
Measurement
Isotopic Ratio
Pu Mass
Absence of Oxide
Pu Presence
Symmetry
Pu Age
Open
Error

Display


System
Measurement
Isotopic Ratio
Pu Mass
Absence of Oxide
Pu Presence
Symmetry
Pu Age
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Complete
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